CHAP. XII.

ACCOUNT OF FOSSILS—AND MINERALOGICAL REMARKS.

AT Tokay I had quitted the plain, and entered the hilly country: this continues to the great Carpathian Alps, a diſtance of two or three days journey, where I was very anxious to be during the fine ſeaſon, that I might botanize there. Yet, being informed that ſome very remarkable foſſils had been found in theſe hills, I thought it worth while going a little out of my direct road in queſt of them.

The 29th of June I left Tokay. The moment I was out of town I obſerved great rocks of baſalt overhanging the road, and a mile or two further, the *Volcanic Zeolite* of Mr. Fichtel. This is certainly a very curious foſſil, and it as certainly forms rocks: but whether it be volcanic, and, if volcanic, whether it be *Zeolite* or not; every one will decide, on the firſt queſtion, as he is prepoſſeſſed in favour of *Plutonic* or *Neptunic* theories; and on the laſt, according to the definition he may give of Zeolite. It formed on the left hand ſide of the road a bank, which in ſome places was fairly expoſed to view.

It is of an aſh colour *, here and there variegated with red, very fragile, and the texture like a congeries of ſmall tunicated ill-ſhaped beads, of a rather greaſy luſtre. It greatly intumeſces under the blow-pipe, even to thrice its bulk, and forms a white ſcoria; but it only ſlightly phoſphoreſces, and forms no gelly with nitrous acid, which are two of the principal characters of Zeolite. In ſome parts the little globules, which are formed of different coats, contain a *nucleus* of *Obſidian;* the thin coats are eaſily detached. Of theſe *nuclei* I picked up a great many at the foot of the bank, moſtly of the ſize of a pea, but ſome of the ſize of a bean: they are more or leſs angular, but never cryſtallized as Mr. Fichtel informs us. I have ſeen his pretended cryſtals, and can aſſure my readers, that none but thoſe who are blinded by mineralogical hypotheſes, and call in conceding fancy inſtead of ſevere judgment to be their counſellors, can think them ſuch. Theſe globules likewiſe ſwell under the blow-pipe, and form a whitiſh glaſs. Mr. Fichtel, who, I know, is very expert with the blow-pipe, ſays, in his *Mineralog. Aufſat.* page 277, that he could only melt the Lipary Obſidian; and thoſe of Hekla, Tranſylvania and Hungary, he found to be altogether infuſible. This greatly ſurpriſes me; and the infuſibility of this foſſil is aſſerted by him likewiſe in his account of the Carpathian mountains, page 580. I have tried the ſmall grains, and fragments of pieces two or three

* Cinereus durus fragilis unctuoſo-nitens, textura craſſe granulata ex globulis parvis angulosis tunicatis.

Tubi Ferruminatorii ope ter volumen auget & ſcoriam albam cum parum phoſphoreſcentiæ præbet.

pounds

pounds weight, but they all proved fusible. This is probably the "*Verre volcanique en grains noirs, réunis par une Lave compacte grise,*" of Mr. Born's *Catalogue Raisonné*, page 449, and the loose grains, his "*Verre volcanique noir, en grains isolés,*" page 450.

Mr. Klaproth has been so obliging as to analyse this fossil for me (I mean the pearly Matrix). He found it to swell up only moderately, when heated, and less than the other varieties of the same fossil; and that a piece of it, in a clay crucible, after remaining in a wind furnace for two hours, was not melted, and continued of the same shape; but the colour was changed to a reddish brown, and it had lost $4\frac{1}{2}$ per cent. of its weight. Another piece of the same, exposed in a clay crucible, to the heat of a porcelain furnace, melted into a whitish grey glass with an even and polished surface: in the fracture, however, it was full of fine froth-bubbles, scattered with white, black, and oker coloured grains imperfectly vitrified, about the size of millet seed; from whence the glass had a variegated and spotted appearance. Analysed in the wet way, it gave,

Weighed in the red hot state,	Siliceous Earth	$71\frac{1}{2}$
	Argillaceous	$18\frac{1}{2}$
	Calcareous	$1\frac{1}{2}$
	Calx of Iron	1
		$92\frac{1}{2}$
The volatile parts lost in the fire		$4\frac{1}{2}$
		97
Loss		3
		100

The

The ſpecific gravity of this piece was 2,332; another, which was variegated with red, 2,342; another, with more red in it, 2,381.

In Mr. Pallas's *Nordiſhe Beyträge* there is an account of a foſſil lately found near that diſtant corner of the world, Kamſchatka, which ſo perfectly correſponds with this, that I think, as works in the German language are ſo ſeldom tranſlated into ours, I ſhall be thanked, by our Engliſh mineralogiſts, for laying a tranſlation of it before them.

"If we wiſh to increaſe the names of foſſils," ſays Mr. Pallas, "which is now much the faſhion, the ſtone from the Marekanian mountains, on account of its ſingular nature and properties, deſerves a particular name, much more than many new-named foſſils. Moſt foſſils, with ſcarce any variation, are common to different places: this is particularly the caſe with the *mountain rocks*, which are repeated in every chain of mountains; but I know of no example of one being found in any part of our globe, ſimilar to this. The (Bergart) mountain-rock is very fragile, and conſiſts of remarkably thin, pearl-coloured, glaſſy, ſhining, and tranſparent leaves, which are curved and interwoven in one another in all poſſible ways; they may be crumbled between the fingers, although when united together they ſcratch glaſs: it is not porous like pumex, and has ſtill leſs the appearance of lava: it has much more the appearance of foliaceous zeolite, and when broken looks like pounded glaſs. In this

maſs vaſt numbers of ſmooth, hard, in every way compreſſed, obtuſe-angular, roundiſh, or longiſh pebbles, which here imitate water-worn pebbles of ſmoked quartz *(Rauchtopaz)*, there drops of opake enamel, lie enveloped and variouſly interwoven with, and ſurrounded by, theſe leaves or ſcales. They are of the ſize of a great or ſmall nut, though often much ſmaller, even not bigger ſometimes than millet or poppy-ſeed.

" Long ago theſe pebbles, or whatever you pleaſe to call them, were found in muſeums; and when I was in Siberia, the ſmoke-coloured tranſparent kind were brought in abundance to Irkutz, where they were ſold for poliſhed ſmoked topazes. Yet I do not find them mentioned by Steller in his Mineralogical Remarks, although he was on the ſpot, and has given an account of other remarkable things. The fine leafy *mountain-rock*, which ſometimes entirely forms little balls which have no other ſtony *nucleus*, but are compoſed, to the very centre, of concave leaves lying one upon another, and ſometimes ſurrounds theſe pebbles, which we ſhall next deſcribe, has the very remarkable and ſtriking property, without any addition, to ſwell up under the blow-pipe, with ſome noiſe, as quick as alum or borax, and to be changed into a fine white frothy light and friable ſubſtance. If we increaſe the blaſt, it increaſes in bulk, till it is quite ſpongy, and it then cannot by any means be brought into a glaſs bead, either with or without fluxes: ſome pieces crackle and fly before they are red hot, others do not. This particular

effect

effect of fire, with perfect insolubility in acids, drew first my attention to this substance, and induced me to request Mr. Lowitz, apothecary, and member of our academy, to undertake the chemical analysis of it; which I shall subjoin, after I have described the great and small pebbles, which are contained in it in quantities as in a pudding stone.

" These pebbles, according to the specimens which have been sent me, are of two kinds: one kind is just like water-worn polished fragments of smoked crystal, commonly called smoked topaz, and was at first considered as such; but in polishing it is seen immediately that they are much softer, and they readily crack; they are scratched with the file, and fly when struck with a steel, with which they however give fire if struck on a sharp edge; yet they are hardly to be broken when struck with great violence with a hammer. Many are uniformly clear, tinged (clouded) of a yellowish smoke colour, which is hardly observable in very small ones; others have very evident, yet fine streaks or beds of a darker sooty smoke colour. These more or less fine, and quite parallel, beds run completely through the stone, and are in some more abundant and crowded together, in others less frequent, and render the stone more or less cloudy. In one of these stones I have found, on one of its sides, near the surface, an oval sooty spot with a curved surface like a thin leaf grown in it. The shape of these pebbles is generally irregularly round or oval, more seldom oblong, but always amorphous through various superficial

ficial impreſſions; likewiſe polygonal with rounded angles, like the ſhape that wax or clay aſſumes when careleſsly rounded by the fingers, but they are all outwardly quite ſmooth and poliſhed, and look as if they had been melted. The darker-coloured beds are not parallel to the longer or ſhorter diameter of the pebbles, but deviate from it, and run in all directions; and when the ſtone breaks, it is not in the direction of theſe apparent beds, but in indeterminate fragments, quite accidental, and with a concavo-convex and ſplittry fracture, like ſoft glaſs *(weiches glaſs)*. The edges and corners do indeed cut glaſs a little, but they are ſoon worn away. The ſize of theſe pebbles is very various, and they are found from the ſize of muſtard or poppy-ſeed to that of a haſel-nut, ſeldom greater; yet ſometimes they are almoſt as big as a walnut. This ſubſtance, which has all the appearance of glaſſy quartz, in a moderate red heat, or before the blow-pipe, likewiſe begins, yet in a leſs degree, to turn white and become frothy, and changes to a fine ſubſtance like pumex, which may be impreſſed with the nail. In heating it ſeems to emit a white phoſphoreſcent light. The ſcorification hardly enters above a quarter of a line, and the internal part remains ſtill firm and tranſparent: if this is broken, every fragment ſhews the ſame appearance when heated; commonly the external parts begin to crackle and fly before they are throughout red hot.

"The other kind, which, according to the following obſervation of Surgeon Allegretti, are found in a different part of the mountain,

have the ſame ſhape as the preceding; they are generally a little bigger and harder, quite opake, of a more or leſs pale or deep brick colour, marked more or leſs with blackiſh ſpots and ſtreaks, and veined or reticulated like a gland. They fully reſemble a marbled enamel, are generally on one ſide more rounded, on the other more preſſed (concavo-convex), and round about edged as a melted ſubſtance poured into ſmall holes or cavities. Struck with a ſteel they give more fire than the preceding; and reſiſt the greateſt ſtroke of a hammer; under the blow-pipe they ſtill more readily than the tranſparent ones change to a pearl or whitiſh colour on the ſurface, without great expanſion, and this ſcorified ſurface then very eaſily falls off in ſcales. Such are the external qualities of theſe remarkable ſtones, and of the ſtill more remarkable *mountain-rock* in which they are included. How far the following chemical analyſis of Mr. Lowitz, which I give in his own words, can throw light upon their remarkable properties, I leave to the deciſion of others, till I ſhall receive a greater proviſion of them (which I am waiting for), and have it then in my power to ſupply the learned of foreign countries.

'Chemical analyſis of a kind of foſſil like Quartz Pebbles, with the mountain-rock in which they are found.—Theſe roundiſh ſtones, which are given out for volcanic productions, are chiefly of the ſize of a hazel nut, and have a ſmoky tranſparent appearance; but there are ſome which are opake, and of a liver colour ſprinkled with blackiſh and reddiſh ſpots; they are conſiderably hard, ſcratch glaſs

and ſtrike fire difficultly with a ſteel. The ſpecific gravity of the tranſparent kind is to water as 2,3651 to 1,0000, of the opake kind as 2,3592, and of the mountain-rock as 2,3333. One of theſe clear pebbles, which weighed ſeventy-five grains, was repeatedly made red hot in a covered crucible, and each time quenched in cold water; by this operation it became white, and ſomewhat ſpongy on its ſurface; in the middle neither its clearneſs nor tranſparency was changed in the leaſt. I then broke it into ſmall pieces, and placed them once more for two hours in a ſtrong red heat, by which not the leaſt change was now produced on their new ſurfaces, but they remained conſtantly clear, with the edges ſharp and tranſparent. After all this long proceſs in the fire, I only found a loſs of one grain in weight.

The pebble which had been thus treated was ground very fine, and fifty grains of it were placed in a crucible with three times its weight of decompoſed mineral alkali, and heated as much as poſſible for three hours, (yet) without ſuffering it to melt: then the cooled white ſubſtance was ſuperſaturated with aqua regis, and boiled for a few hours in a ſand-bath; then filtered, and the undiſſolved ſiliceous earth carefully waſhed with diſtilled water; then dried, and at laſt ſtrongly heated in a crucible. This then weighed thirty-ſeven grains. Fourthly, A little dry phlogiſticated alkaline ſalt was added to the filtered ſolution, and Pruſſian blue was then precipitated; eight grains were required to its entire precipitation. Then all was boiled in a retort till it was reduced to a few ounces, then filtered, the Pruſſian blue

well waſhed, dried, and at laſt, together with the paper, burnt and calcined in the crucible; which, deducting for the aſhes of the paper, and for the reſiduum of the iron from the phlogiſticated alkaline ſalt, gave half a grain of iron.

5thly, Upon dropping a few drops of vitriolic acid into this ſolution, now free from metal, there was not the ſmalleſt indication of ponderous earth.

6thly, The ſolution was evaporated to a few ounces, and its contents precipitated by cauſtic volatile alkali; but the earthy precipitate, after being filtered and waſhed, but not dried, was perfectly diſſolved in a ſuperfluous quantity of vitriolic acid.

7thly, This ſolution had the taſte of alum; its contents I precipitated by boiling it ſtrongly with dry earth of magneſia: I then boiled it with depurated mineral alkali, placed it on the filtrum, waſhed, dried, and at laſt heated it in a crucible, by which means I obtained ſix grains of argil.

8thly, The ſolution, containing the earth of magneſia, was precipitated by a ſolution of mineral alkali: this precipitate, after being edulcorated and dried, weighed three grains more than the magneſia that had been uſed to precipitate the argil. Theſe three grains, after being heated red hot, produced one and a half grain of cauſtic earth of magneſia.

9thly, Now the fluid which had remained after the precipitation of the argil and magneſia by the volatile alkali (No. 6) remained to be examined. This was likewiſe evaporated to a few ounces, which,

by the addition of a pure ſolution of vegetable alkali, yielded an earthy precipitate; this being waſhed and dried, gave ſix grains of aërated calcareous earth, and, being heated red hot, yielded three and a half grains of quick lime.——From theſe experiments it appears, that one hundred grains of the clear pebble have the following component parts:

Siliceous Earth	74	grains weighed in the red hot ſtate.
Argil -	12	
Lime -	7	
Magneſia	3	
Iron -	1	
	97	
Loſs	3	
	100	

10thly, The Mountain-Rock, which contains the pebbles juſt examined, was analyſed in the ſame manner, and gave the ſame products; but with a trifling difference in their proportions. Yet the following remarkable circumſtance deſerves to be noticed:—With the blow-pipe it ſwells up like alum or borax, with a crackling noiſe and phoſphoreſcent light, into a remarkably porous, frothy, very fragile ſnow-white ſubſtance, which afterwards is infuſible. But not leſs ſingular is it, that the juſt mentioned property of this Mountain-Rock entirely ceaſes, without loſing its remarkable appearance, without a viſible alteration of this appearance, and even without a conſiderable loſs of its weight, as ſoon as it is made red hot

hot in a covered crucible; after this the blow-pipe has no effect upon it. As the analyſis of this foſſil gave nothing but known earths as its fixed component parts, ſo I am induced to think, that the remarkable appearance produced by the blow-pipe probably depends on ſome kind of elaſtic fluid, which is expelled by the effect of the fire, and which produces that appearance only by the immediate contact of free air and flame; whereas, on the contrary, when heated in a covered veſſel, it vaniſhes unnoticed, without producing any effect on the mineral itſelf.'——The analyſis of the red pebbles, which was not terminated at the concluſion of this volume, will be given ſome other time."

The deſcription of the foſſil from near Kamſchatka ſo admirably agrees with the characters of this from Tokay, that I have purpoſely abridged my own deſcription, as that of the one anſwers for the other; except that the glaſs globules of the Siberian foſſil are more diaphanous than thoſe from Tokay, and here they are never red. Yet theſe are more diaphanous than the Obſidian from Iceland or Lipari; and Mr. Fichtel * mentions one kind found at Pecklin, in the ſame diſtrict, which is juſt like bottle-glaſs, conſequently with nearly a ſimilar tranſparency. Nor, if we examine the matter more cloſely, will the abſence of the red pebbles or globules make a difference; for by the analyſis it is found, that the globules and their matrix, however

* Mineral. Bemerkungen von den Carpathen, page 578.

they

they differ in their external appearance, are the ſame, even in the diſpoſition to loſe their property of intumeſcing on heating, by this being performed in a covered veſſel *. For it is clear, though the learned chemiſt did not advert to it, that it is exactly the ſame cauſe, which made the clear and tranſparent fragments of the previouſly heated pebbles not loſe their qualities on being again placed in the furnace, which made their matrix remain unaffected by fire when heated in a cloſe veſſel, and then be not affected by the blow-pipe: and I lately ſaid that the grey matrix was intermixed with red, and I have ſmall ſpecimens in which the red predominates; this need therefore only have had untunicated *nuclei* (for the red pebbles, it will be recollected, were quite opake) to be perfectly ſimilar, and it really has; but they are generally tunicated till they become by exfoliation of the ſize of a poppy ſeed, and it is then difficult to examine them.——The reſemblance of the two, that from near Kamſchatka and that from Tokay, is ſtrikingly alike.

The foſſil on which I have been ſo diffuſe, is not a rare foſſil in this part of Hungary. The matrix forms, according to Mr. Fichtel,

* On this point Mr. Pallas and Mr. Lowitz ſeem to differ: for the former ſays, that the fragments of the internal part of one of theſe pebbles which had been heated, gave the ſame appearance, on being again heated, as the pebble itſelf did at firſt; whilſt Mr. Lowitz not only ſays that the internal part continues clear when in the pebble, but its fragments on ſubſequent heating loſe nothing of their tranſparency.

the

the mountains or hills of Pap-Laſſo, Cſcherhezy-Farka, and in part the Schators, and ſeveral other hills about Telke-Banya and Tokay; in ſome of which places it contains the globules of Obſidian: theſe are likewiſe found looſe and ſcattered about in many places in theſe Hungarian *Campi Phlegræi*, as may be learned from Mr. Fichtel's work, and Mr. Born's *Catalogue Raiſonné*.

Mr. Fichtel gave me ſome of his black coal-like Zeolite, deſcribed by him, page 652; and Mr. Klaproth was ſo kind as to examine it for me. He found it ſwell up under the blow-pipe more, and more readily than that mentioned page 277: being heated in the ſame manner for two hours, it likewiſe loſt $4\frac{1}{2}$ per cent. and placed in a porcelain furnace in a clay crucible, it melted into a ſimilar glaſs; but the colour was of a browner caſt. The analyſis in the wet way gave,

Siliceous Earth	68	weighed in the red hot ſtate.
Argillaceous	20	
Calcareous -	$3\frac{1}{4}$	
Calx of Iron	2	
	$93\frac{1}{4}$	
Volatilized in the fire	$4\frac{1}{2}$	
	$97\frac{3}{4}$	
Loſs	$2\frac{1}{4}$	
	100	

Its ſpecific gravity is 2,357.

Had

Had I heard of these curious rocks when I was at Tokay, I should certainly have arranged things so as to have seen them more at leisure; but after keeping my driver a few minutes, I was obliged to continue my journey. A mile or two still further, I came to the stone quarry from whence the light white cellular stone, used at Tokay for building, is taken. It is what the Germans call hardened clay *, but cellular; the cells in some places are partly filled up with a fibrous substance like decomposed pumice. Is this rock a decomposed porphyry or basalt, lava, &c.? These never contain pumice, if this striated matter be pumice: it is certainly not a volcanic tufa? It has a few grains of pellucid quartz mixed in it, as some porphyries have, but they are very few. The shortest and most fashionable way would be, to call it boldly a decomposed Lava.

The country from Tokay to Maad is very pleasant, particularly soon after leaving Tokay, where on one hand you have hills covered with vines, and a fine plain variegated with woods, and the river Bodrog meandring through it on the other. In four or five hours I reached Maad, where I took up my quarters with Baron Orcy's steward, and

* Argilla indurata Germanorum.

Alba fractura inequalis, textura terrea impalpabilis, cultro facile rasilis, foraminibus mediocribus & parvis sparsis, vacuis, aut materia dilute ochracea friabili cariosa fibrosa repletis.

Tubi ferruminatorii ope, et basis & concretiones vitrum album opacum præbent sine phosphorescentia aut intumescentia.

Obs. Particulæ paucæ Quartzi pellucidi quæ sæpe in porphyriis inveniuntur, adsunt, sed raræ.

in the afternoon, accompanied by a new acquaintance, who was to be my Cicerone, I went to Tallia; he was neither a naturaliſt nor a philoſopher, and got ſo beaſtly drunk, that I was obliged to get rid of him. At Tallia I found another quarry of the white indurated clay; and in returning I obſerved a great quantity of fragments of whitiſh petroſilex, containing vegetable petrifactions or impreſſions, ſcattered about on a common. In the ſtreets of Maad lay great heaps of a *breccia* of *petroſilex*, ſome of which was very pretty, and of a greeniſh caſt: it is probably uſed here for building. The Baron's cellar is formed in the white indurated clay.

From thence I went to Tolchva, which is only a ſtage diſtant. By the road ſide, near Liſka, there is a bank of fine white ſand, or a ſtone ſo friable as to fall readily into ſand: from the demand for it, I ſuppoſe for houſehold purpoſes, a great excavation has been formed. It feels very harſh between the fingers; under the blow-pipe it at firſt crackles, and then ſwells up to thrice its bulk, phoſphoreſcing and producing a white light ſcoria that ſwims in water, which in a ſtronger fire is turned to a white glaſs. This is nothing but a kind of tufa, formed entirely of the detritus of pumice, or rather of ſomething very analogous to it; it contains ſome ſmall fragments of grey volcanic glaſs *. In ſome places it is much coarſer, being mixed with

* Tufa.

Alba heterogenia terrea inequale-granulata aſperrima valde friabilis, granulis Obſidiani nigri & cinerei rarius inſperſis.

Tubi ferruminatorii ope crepitat intumeſcens ter volumen auget, phoſphoreſcit, ſcoriam aquæ innatantem præbet, & in igne fortiori vitrum album.

an.

an imperfect kind of pumice in small fragments, and the grey volcanic glass *. This is covered by another kind, composed of fragments of pumice of the size of a pea, intermixed with a few fragments of the same grey volcanic glass, lightly cemented by an earthy ochre-coloured substance †.

Tolschva is like Maad, a disagreeable ill-built town, and doubly disagreeable to me from the quantity of Jews in it. Though it only contains about 3000 inhabitants, there are 160 families of Jews, as a gentleman, who had been engaged in drawing up the *conscription lists*, assured me. A dislike to a people whose sole concern is gain; who consider cunning and deceit as estimable qualities, and are insensible to the beauties of nature, does not, I hope, indicate a bigoted mind. Jews are very common in Hungary, not in the great towns alone, but in the small ones, and in the villages. Some gentlemen will not suffer them on their estates, though they are always ready to give a higher rent than other tenants. In countries where they are restricted to the great commercial towns, where they have full scope for their trafficking

* Tufa.

Alba ex fragmentis minoribus & parvis Pumicis, in massa alba heterogenia terrea inequale-granulata asperrima valde friabili; granulis Obsidiani nigri & cinerei inspersis.

† Tufa.

Ex fragmentis minoribus & parvis Pumicis, ope terræ ferruginiæ friabilis, leviter conglutinatis.

Obs. Granulæ Obsidiani non omnino desunt.

talents, they do leſs harm: it is there pretty much Jew againſt Jew; but when they get into ſmall towns and villages, they do great miſchief, and frequently ruin the peaſants and lower kind of people, by furniſhing them with luxuries on credit, and then artfully come upon them, and ſeize upon their property for payment. In Germany and Bohemia I likewiſe found too many of them fixed in the ſmall towns and villages: how they ſwarm in Poland is well known. The Emperor Joſeph was at great pains to make this people more uſeful, and leſs detrimental to the ſtate, but he met with inſurmountable obſtacles. As a fair and honeſt diſpoſition is of the greateſt advantage to a nation, this ſhould not be damped by examples of men getting forward in the world by being deſtitute of it. All religions, and all principles of morality and politics, are not equally beneficial to a ſtate, and I can ſee no reaſon why the increaſe of a dangerous ſect ſhould not be prevented, or the whole ſtock removed.

I examined ſome hills covered with vineyards near the town; they are compoſed of a reddiſh porphyritic baſalt, which is ſeen in many places where the heavy rains have waſhed away the ſoil and formed ravines. The quantity of jaſper found here is ſurpriſing; the walls or diviſions of the vineyards are made by piling up great looſe blocks or fragments of it: it varies much in its colours; it forms veins in theſe porphyrous hills. In other neighbouring hills ſome attempts have been made in mining, which have not been crowned with ſucceſs: one gentleman has loſt near two thouſand pounds,

almoſt all he had to loſe. Near theſe mines I found another bed of the white clay, but here it was ſo little indurated, or rather ſo much decompoſed, as to crumble between the fingers. Not far from hence I picked up ſome globules of *Obſidian*.

In the walls of the houſes, and in the ſtreets, I noticed a very beautiful breccia *, formed of ſmall fragments of a lively green-coloured petroſilex, united by an almoſt imperceptible coating of chalcedony.

I ſhould not have ſtaid here above half a day, for the ſquire of the place, Mr. Sirmay, for whom I had a letter of introduction, was not at home, but no horſes were to be had: they were all employed in tranſporting the *don gratuit* of corn made by the nobility to the emperor †, and on this account I was detained a day longer, and then I went to Uihelly with Mr. Berhelly, the gentleman who was both

* Breccia.

Ex fragmentis minoribus Petroſilicis viridis cultro vix rafilis ſcintillantis, ad angulos ſubdiaphanæ, & paucis Jaſpidis rubræ, ope Chalcedonii albo-cæruleſcentis vix nudo oculo diſcernendi, conglutinatis.

Tubi ferruminatorii ope color viridis evaneſcit, & ad angulos vitrum album præbet.

† This is another grievance under which the peaſants labour; and at particular times and on particular roads it is a very ſevere one. They are obliged to tranſport the ammunition and proviſions for the army, and every thing that is for the public ſervice, and they receive ſtill leſs pay than from travellers.

my

my hoſt and Cicerone, as he and ſome more gentlemen of the town were going to the county meeting. We made a large party, a whole waggon full; for this was the vehicle of conveyance. The ſubject of converſation on the road were the Germans, who had been ſettled here by the Emperor Joſeph, againſt whom they raiſed great complaints for having neglected and miſmanaged the farms which had been given them; I was hardly ſuffered to ſay a word in favour of German induſtry, though my companions acknowledged that againſt the German colonies, planted by the empreſs Thereſa, they had nothing to ſay.

On the road I found ſeveral kinds of Baſaltes, one ſo glaſſy as to be almoſt a *pitch-ſtone*, and the *Saxum metalliferum*, but the mica ſo fine as to require almoſt the aid of a lens to be viſible, and a Porphyry * which has the white indurated clay for its baſe; but this is ſo hard as to give fire with ſteel: it contains large grains of pellucid Quartz and Feldſpar, or rather Adularia. This was only a ride of four or five hours; we paſſed by Patax, where the Calviniſts have a college which is only inferior to that of Debretzin, and the ruins of an old fortreſs, which formerly belonged to Rakotſy. Corn, Indian wheat, and potatoes, were the produce of the plain through which we paſſed.

* Porphyrius.

Ex argilla indurata alba, cultro vix raſili facile ſcintillanti, particulis parvis amorphis Quartzi pellucidi & parallelopipedis Adulariæ.

I was as unfortunate at Uihelly as at Tolſchva. Dr. Weis, phyſician to the county, for whom I had letters of introduction, was out, and as there was a fair here, as well as a county meeting, the inns and alehouſes, if ſuch exiſted, muſt have been full; but I had no loſs in the doctor's abſence except that of his company, for his lady received me in the moſt friendly manner, and was as kind to me as a mother.

There are ſome very high hills cloſe to the town, which go under the name of Schator; as I recollected to have read in *Mr. Born's Catalogue Raiſonné* of a "*Granite alteré par le feu volcanique*," from a mountain of this name, I immediately began to hunt after it. I aſcended two or three of the higheſt, but I found nothing that could be conſidered by the moſt *fiery* mineralogiſt to have been a granit. I ſaw nothing but porphyry* of a reddiſh brown ground, well charged with particles of *Adularia*, and ſcattered with ſmall cryſtals of black *Hornblende*; the white particles having rather a roundiſh than a parallelopipedal form, I ſuſpected them to be *Leucites*, or white Veſuvian Garnets, but they melt with the blow-pipe like Adularia, and have a ſparry appearance when viewed with a *lens*.

* Porphyrius.

Ex Jaſpide? hepatica particulis albis ſubdiaphanis Adulariæ, & ſparſis criſtallis parvis Hornblendæ Baſaltinæ, compoſitus.

Tubi ferruminatorii ope baſis ſcoriam albam, & concretiones albæ vitrum diaphanum, præbent.

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In this town there is another quarry of the white indurated clay, which is here likewiſe uſed for building; it is not cellular, like that of Tokay, but almoſt as ſoft as chalk; carefully examined, and with a lens, ſome fine black mica may be perceived. My hoſt cultivates the *Iſatis tinctoria* for making indigo. I ſtayed here two or three days in hopes of his return, but I was altogether deprived of the advantages of his acquaintance.

Where civilization is backward, there the government is obliged to extend its attention to things which at another period it leaves to the care of the public. In Hungary, as in ſome other countries, the health of the public is an object of care of government; and in each county there is a phyſician appointed and paid by it, who has ſurgeons under him. In the ſmaller towns the phyſician's ſalary is forty pounds a year, and the ſurgeon's twenty, beſides other advantages, and their practice. At Uihelly the Sclavonian language begins to be general.

July 5th, I ſet out for Telkobanya; the vineyards ſoon diſappeared, and the ſides of the hills were then covered with underwood inſtead of vines. The vallies between the hills were part corn, part paſture land. The road as far as Balhaſy is frightfully bad. Here I changed horſes and ate ſome eggs, the only thing the village afforded. The peaſants were met at the judge's cottage to adjuſt ſome differences concerning the extent of a field or farm. I have often

often admired the reſpectable conduct of the Hungarian peaſantry; I never obſerved in them any of that ferocity of which they are accuſed in Auſtria, nor that mean and ſneaking diſpoſition, though they treat their ſuperiors with great reſpect, which one might expect to find in a peaſantry hardly emerged from a ſtate of bondage.

Soon after leaving this village, there is on the right hand, overhanging the road, a moſt remarkable rock: it is a ſtrange mixture indeed; a *Breccia* compoſed of fragments of glaſſy *pitch-ſtone (pechſtein)*, both compact and cellular, both grey and black, ſcattered with parallelopipeds of *adularia*, with fragments of pumex, and here and there fragments of a porphyry with a baſe of reddiſh white *petroſilex* with grains of pellucid *Quartz*. Theſe fragments, more heterogeneous in their appearance than in their nature, are imbedded in, or cemented by, a maſs no leſs curious; it is in appearance like ſand-ſtone, or rather granulated *Quartz*, in ſome parts, particularly if viewed with a lens, it has a contorted fibrous texture, in other parts it is more like *pitch-ſtone*, but diaphanous and ſomewhat granulated; where it is moſt compact it ſtrikes fire. Though this *Breccia* appears ſo very heterogeneous, yet it is very homogeneous in its nature; the fragments of the different coloured *pitch-ſtones*, and likewiſe the *pumex* and the cementing matter, are all of the ſame nature: they all intumeſce under the blow-pipe with phoſphoreſcence, and form a white light ſcoria which ſwims in water: ſome ſwell by

heat to five or six times their original bulk.——Here we have again Mr. Fichtel's *zeolites*, and some part of this mass is his black fibrous pumex-like zeolite mentioned by him page 653. This gentleman there makes this just observation, that "all these zeolites, from the light grey to the coal black, run into one another; and I have," says he, "collected a suite of fourteen specimens, in which each variety is closely connected with another, not only in colour, but likewise in texture."——In what countries are such fossils found, and in what catalogues do we meet with such fossils described? Is it not in indisputable volcanic countries, and often where the fire still rages; and in the catalogues of their products? *Neptunismus*, to which I am ready to attribute much of the formation of our globe, or rather of its thin epidermis, with which we are only acquainted, must somewhere cease, and *vulcanismus* begin; and the only difficulty, and where the learned so little agree, is, where shall the one cease and the other begin? I always thought with the great Linneus, "*Ubicunque pumices copiosiores, ibi quondam vivi vulcani exstitere, licet dudum emortui & oblivioni traditi.*" This curious rock appeared to rest on the decomposed argillaceous porphyry.

A little further on are rocks formed of large blocks of basaltes; and still further, I found a great many loose fragments of silex or petrosilex, containing impressions of organic bodies.——Early in the evening I reached Telkobanya, a large ill built village or town. I

took up my lodging, as there are no gentlemen here, with the Judge, and he let me have the beſt he had, which was very little; a ſtraw bed on the floor, milk and eggs and coarſe bread.

I came here in ſearch of the Telkobanya *Chryſopal* and *Waxopal*, but I ſought and ſought in vain. I could find nobody here who knew any thing of it; and afterwards I learnt that it is found three or four miles off. But as Mrs. Weis, my laſt hoſpitable hoſteſs, had given me a handſome proviſion of it, I was leſs anxious about it, and Mr. Fichtel has informed us how it is found. His account is this, that in the Cſcherhezy-Farka hill, which is compoſed of that kind of zeolite which I found near Tokay, there are very large veins of jaſper, ſome ſo large as to form rocks (probably like thoſe I ſaw near Tolſchva): in ſome places it is half decompoſed and cellular; in this, this beautiful foſſil is found; ſometimes forming veins, ſometimes nodules, and theſe latter vary in ſize from the ſize of a man's head to ſmall grains. The veins of jaſper this gentleman conſiders as ſtreams of lava, and ſuppoſes the opal, which it contains, to be afterwards formed by percolation.———The red ſort, which Mr. Born places amongſt the pitch-ſtones, is found on the Feketehegy hill, ten or fifteen miles from Telkobanya. This ſupplies here the place of the jaſper, forming entire and large veins, but the hill itſelf is Porphyry.

Though I did not find what I principally came for, yet I found here ſome intereſting foſſils, not mentioned by Mr. Fichtel.—Cloſe to

the town are zeolite rocks like thoſe near Tokay. In one place, where it is of a more earthy appearance, it is very cellular, and the cells are uncommonly deep and cloſe together, quite like a honey-comb. The blow-pipe ſhewed it, however it differed in appearance, to be of the ſame nature. A little further from the town, I found a bank of very fine white ſtone, like that near Liſka, but ſtill finer; were it not for its harſh feel, it might be taken for chalk, it is ſo very fine: the blow-pipe ſhows its nature at once, it intumeſces greatly.——Further on, in a deep ravine, I met with a rock as curious as any I had hitherto ſeen. It was a breccia of fragments of an imperfect kind of pumice, in which the ſilky appearance of this foſſil was very evident, though it had but little of its fibrous texture: this forms the greateſt part: this is mixed with a much ſmaller quantity of the grey glaſſy pitch-ſtone: theſe two by degrees paſs into one another. Theſe fragments, which are from a quarter of an inch to a pin's head in bulk, ſeem to be cemented by a very thin glaſſy coating, but ſtill of the ſame nature. In ſome of the beds, where all the parts are ſmaller, it looks juſt like a ſand ſtone; and I found a thin bed about half an inch thick, which might eaſily be taken for granulated quartz: this gives fire freely with a ſteel. Here again, however heterogeneous the components of this foſſil may appear to the eye, they are not ſo in their nature; they all greatly intumeſce under the blow-pipe, and form a white ſcoria. Beſides theſe rocks, I found ſome looſe blocks of the aſh-coloured glaſſy pitch-ſtone paſſing into pumice; in ſome parts, particularly if broken in a certain direction, it has nothing

of a fibrous texture; but this, in other parts, is quite evident: it is ſcattered with parallelopipeds of *adularia*, and, if carefully examined, a few particles of black *mica* may be ſeen. Another kind was much more like pumice: the contorted fibrous texture in this is here and there very evident; it is likewiſe ſcattered with a few particles of *adularia* and black *mica* with grains of pellucid *quartz*?

In one of my excurſions in ſearch of the Telkobanya yellow Opal, I met with a vein of jaſper, but a jaſper approaching to the pitch-ſtone; in the middle of a fragment of this, there was a ſmall piece of the *Milk-Opal* which had ſome degree of *fire*. This ſituation agrees with the account of Mr. Fichtel, relative to the ſituation of the Telkobanya Opal. In the road to Caſchau there are great blocks of Petroſilex, or ſomething between Petroſilex and Chalcedony, containing great abundance of vegetable petrifactions. I knocked out of one of theſe blocks a piece of petrified wood near half a foot long, and an inch in diameter; its fibrous texture was very evident.

I only ſtaid a day at Telkobanya, and the evening after my arrival I left it for Caſchau, which is two ſtages diſtant; but as no horſes were to be procured, I was obliged to take up with oxen. I think there is not a greater *ſecatura* a poor mortal meets with in this vale of tears, than that of being obliged to travel ſlow when he wiſhes to travel faſt; and beſides the ſlowneſs of the progreſſion of theſe animals, they indicated by their actions, that they had views

quite

quite oppoſite to mine; wiſhing to ſtop when I wiſhed to go on, and to turn to the right when I wanted to go to the left: they carried their obſtinacy ſo far as to endanger the waggon, but not my neck, which I thought proper to ſecure by walking on the outſide of it. I never wiſh to travel poſt again with horned cattle. Halfway, with ſome difficulty, I exchanged my oxen for horſes. A large party of recruits were halting here for the night; they were ſo ſtrictly watched that they were obliged to ——— in the ſtreet before the door of a barn, which was to be their ſhelter for the night. I enquired of a man, whoſe attention they had likewiſe attracted, what they were.—O, Sir, ſaid he, you *ſee* they are *volunteers*.—It immediately brought to my recollection a circumſtance which happened a few years ago in the Highlands of Scotland, where a great Highland chief thought proper to raiſe a regiment, and to complete it, I imagine, the quicker, ſent his peaſants, *nolens volens*, as ſoldiers. Some of theſe, in whoſe breaſts the martial ſpirit was extinct, and who had but little ambition for military glory, he ſent in a cart, bound or hand-cuffed.—Well, ſaid a traveller who met them, what's all this; what are you doing there my lads?—O, Sir, replied they, we are only his Grace's *volunteers*.

This was Saturday, and the inn, or ale-houſe, was kept, as they often are in this part of the country, by a Jew. I walked in, and found it, as I expected, a filthy place. I called for ſomething, it was brought me by a Chriſtian girl, and when I wanted to pay the miſtreſs

miſtreſs for it, ſhe made me lay the money on the table, but as I ſaw no more on it, I imagine at her leiſure ſhe would put it in her pocket.———Religion, what art thou?——but too often a ſubſtitute for moral goodneſs!———What ſhould thou be?———a penal code to vice, and a declaration of reward to virtue.

I now travelled on with my unhorned cattle a little faſter. The road paſſed through a broad valley, with high hills at ſome diſtance. Whether theſe were of volcanic, or of neptunic origin, I cannot ſay; but about a mile on this ſide Caſchau, there is a paltry ſtone-quarry, and here the rock is a kind of *Micaceous Schiſtus*, where the *Gneiſſum micaceum*, & *Gneiſſum fornacum* are mixed together.

CHAP.